

Wakeman, Ohio, 16th, most violent storm ever experienced in this section; buildings torn to pieces or unroofed, orchards and forest trees uprooted, fences scattered and crops destroyed. Cherokee Co., Iowa, 28th, about 4 p. m., tornado from the southwest passed over the town of Cherokee, demolishing several buildings and killing three persons. From this point the storm passed northeastward over portions of Buena Vista, Clay and Palo Alto counties. The destruction was mostly confined to the country, where the loss to farmers was very great. Calhoun Co., Iowa, 30th, about 5 p. m., tornado formed southwest of the town of Manson, and moving northeastward, visited that place, where nearly every house was destroyed and several persons killed. The storm continued its course northeastward through the northwestern portion of Webster Co. and the southeastern portion of Humboldt Co., in both of which the destruction of buildings, crops, fences and farm machinery was very great. Anna, Ill., 2d, 4 miles west of station, heaviest wind storm that has visited this section for years; barns and sheds were blown to pieces, trees stripped of their foliage, and many of the larger ones twisted in two. Boonville, Mo., 7th, very violent, much damage to crops and fences, and several buildings blown down. Tuscola, Ill., 5th, 8 miles north of station, very violent wind storm, causing great damage to fruit trees, crops, buildings and fences. Nokomis, Ill., 29th, 5 p. m., most terrific for years; trees, buildings and fences blown down; farm crops suffered severely; at Shelbyville a heavy freight train was brought to a stand, and could not be moved until storm abated. North Platte, 25th, 5.40 p. m., wind backed to northwest and west and blew a hurricane, with gusts of 90 miles per hour; path of destruction commenced about 10 miles west of station, and pursued a course nearly due east for a distance of about 140 miles. Several wind mills and buildings were blown down before reaching the city, which the storm traversed in the northern part, demolishing the round house of the Union Pacific Railroad Company, killing 1 person and wounding 2 others; one portion of the building was carried to the northeast, and the other to the northwest. Heavy masses, in some instances weighing ten tons, were carried a distance of 200 feet. Storm appeared to follow the Platte river. Washington, D. C., 27th, about 8 p. m., heavy northwest storm; large number of buildings unroofed and partially blown down; shade trees uprooted and fences prostrated; loss estimated at about \$140,000. Course of storm NW. to SE.; no damage committed outside of city limits.

VERIFICATIONS.

Indications.—The detailed comparison of the tri-weekly indications for June, with the telegraphic reports for the succeeding twenty-four hours, shows the general percentage of verifications to be 86.75 per cent. The percentages for the four elements are: Weather, 88.2; Direction of the Wind, 80.1; Temperature, 87.6; Barometer, 81.7 per cent. By geographical districts they are: For New England, 86.3; Middle states, 87.1; South Atlantic states, 88.3; Eastern Gulf states, 89.3; Western Gulf states, 95.1; Lower Lake region, 85.8; Upper Lake region, 84.3; Tennessee and the Ohio valley, 87.7; Upper Mississippi valley, 85.0; Lower Missouri valley, 77.4; Northern Pacific coast region, 75.0; Central Pacific coast region, 90.9; Southern Pacific coast region, 100.0. There were 180 omissions to predict (60 being due to the absence of reports from the Pacific coast), out of 3,690, or 4.88 per cent. Of the 3,510 predictions that have been made, 125, or 3.56 per cent., are considered to have entirely failed; 101, or 2.88 per cent., were one-fourth verified; 389, or 11.08 per cent., were one-half verified; 277, or 7.89 per cent., were three-fourths verified; and 2,618, or 74.59 per cent., were fully verified, so far as can be ascertained from the tri-daily reports.

Cautionary Signals.—Eighty-one Cautionary Signals were displayed during the month, of which 63, or 77.77 per cent., were fully justified by winds of 25 miles per hour, or over at, or within a radius of 100 miles of the station. No Off-Shore Signals were displayed. The above does not include signals ordered at display stations where the velocity is only estimated; 122 winds, of 25 miles or over, were reported, for which no signals were ordered; 14 signals were ordered late.

NAVIGATION.

Stage of Water in Rivers.—In the table on the right hand side of chart No. III are given the highest and lowest stages of water, as observed on the Signal Service river gauges during the month of June, 1881. In the Red, Arkansas and Savannah rivers the highest stage was reached on the 1st, and the lowest between the 23d and 30th. The highest stage in the Missouri river was reached between the 15th and 16th; in the Mississippi with considerable irregularity, but generally between the 15th and 24th; at Keokuk the water reached within 13 inches of the danger line on the 21st; at Vicksburg within 16 inches on the 1st, and New Orleans within 4 inches on the same date. In the Ohio, highest stage between the 10th and 16th, the water rising 85 inches above the danger line at Pittsburg. In the Cumberland, Tennessee and Monongahela the highest stage was reached between the 5th and 13th. The Willamette, at Portland, Or., reached its highest stage on the 16th.

Floods, due to unusually heavy rains, were particularly destructive throughout the western portion of Pennsylvania, and extending thence down the Ohio affected in a less degree the bordering states. *Arkansas:* Little Rock, 9th, lower portion of city flooded; sewers bursted, causing great damage. *District of Columbia:* Washington, 27th, 2.34 inches of rain fell in 38 minutes, flooding cellars and basement stores, and injuring sewers. *Indiana:* Seymour, 8th, most violent and heavy rain-storm ever experienced in this section; railroad tracks washed away and all travel closed; many houses flooded and business partially suspended. *Illinois:*

Peoria, 6th, streets flooded and all streams in vicinity above their banks; several bridges on the Bureau Valley road washed away. Farmer City, 6th, heaviest floods for years; large areas of corn and wheat lands under water, and all farm work suspended; great damage to farming interests. *Michigan*: Manistee, 16th, unusually heavy rain: cellars flooded and streets badly washed; one bridge carried away. *Ohio*: Millersburg, 16th, crops on hill lands badly washed; railroad travel greatly delayed by numerous wash-outs. Mount Vernon, 15th, railroad and highway bridges washed away; crops severely damaged. Steubenville, 11th, river 39 feet above low-water mark and stationary; lower portion of city submerged; all travel suspended, either by rail or boat; thousands of acres of wheat and corn along the bottom lands submerged. East Liverpool, 11th, highest water for many years; most of the pottery works obliged to close; western portion of city flooded, and people compelled to leave their houses. Warren, 10th, Mahoning river overflowed; lower portion of city submerged; bottom lands under water; great destruction of property. Youngstown, 10th, Mahoning river overflowed; low lands submerged, causing much destruction of property. Portland Station, 10th, river highest ever known: great loss to crops. Warrenton, 10th, portion of city submerged; all travel and business closed. Medina, 10th, highest for many years; stock had to be removed to high lands for safety; bridges carried away and roads impassable. Minerva, 10th, river highest for many years: the debris of bridges, trees, fences and buildings floating down stream; great loss of property in town and country. Wellsville, 10th, greatest flood ever known; lower portion of town completely inundated; destruction of property very great. *Pennsylvania*: New Castle, 10th, Shenango and Neshannock rivers, highest during the past 67 years; four fifths of city submerged; every rolling-mill, machine-shop, furnace and factory in the city flooded; all telegraph lines down: loss, over \$100,000. Connellsville, 10th, the Youghiogheny river highest for many years; railroad bridge swept away. Towlerville, 10th, city submerged; loss of property very great. Parker, 10th, highest water since 1873; water works 10 feet under water; glass works partially flooded; many houses abandoned; all railroad travel closed. Meadville, 10th, has rained incessantly since the 5th; French Creek overflowed; railroad tracks badly washed, and all travel ceased. Freeport, 10th, river highest since 1865; most of the town submerged; bridges all gone; houses in lower portion of town afloat; impossible to estimate the damage. Beaver Falls, 10th, Big Beaver river, highest for many years; portion of town flooded; all railroad traffic suspended. New Brighton, 10th, huge landslide along the Alum Rocks, covering the railroad track to a depth of from 10 to 60 feet; Beaver river highest for many years. Monongahela City, 10th, water highest for many years; country about badly flooded; roads in a fearful condition; very little damage in city. Emlenton, 10th, highest water since 1865. West Newton, 10th, water highest for many years; considerable damage to mill property. Pittsburgh, 10th, highest water since the great flood of 1832: over 3,000 buildings submerged. The principal loss of property falls to the lumbering interests, and it is estimated that at least 10,000,000 feet of lumber was floated off along the Allegheny; all railroad traffic has been very seriously obstructed, and the losses to the various companies reach over \$100,000. No great damage was committed along the Monongahela, as much of the perishable property was removed in anticipation of the flood. The entire loss to property in city and vicinity is estimated in round numbers at \$2,000,000. The following are the highest stages of water ever recorded at Pittsburgh, with dates of same: November 10th, 1810, 32 feet; February 10th, 1832, 35; February 1st, 1840, 26.9; April 19th, 1852, 31.9; April 12th, 1860, 29.7; September 29th, 1861, 30.9; January 20th, 1862, 28.7; April 22d, 1862, 25; March 4th, 1865, 24; March 18th, 1865, 31.4; April 1st, 1865, 21.6; May 12th, 1865, 21.6; February 15th, 1866, 22; March 13th, 1869, 22.6; March 18th, 1870, 22; April 15th, 1871, 20.6; December 14th, 1873, 25.6; January 8th, 1874, 22.4; December 28th, 1875, 21.6; September 19th, 1876, 23; January 17th, 1877, 23.7; December 11th, 1878, 24.2; March, 1879, 20; February, 1880, 21.6; February, 1881, 23.4. Industry, 11th, river 40 feet above low water mark; highest ever known; lower portion of town completely inundated; great destruction of property above and below the railroad. Kittanning, 11th, lower portion of town completely submerged; business entirely suspended; people leaving the city. Sharpsburg, 11th, water highest for many years; all trains stopped; market gardens along the river bank completely destroyed; lower portion of city submerged; bridges all gone; business suspended. Etua, 11th, lower portion of town submerged; all railroad travel closed; town entirely surrounded by water; people passing out by means of a temporary ferry. Franklin, 10th, southwestern portion of town flooded; all roads impassable; railroad travel closed; bridges and culverts washed away. Greenville, 10th, lower portion of town submerged; all trains delayed and tracks washed out. Scranton, 10th, lower portion of city flooded; highest water for many years. Aberdeen, 10th, railroad tracks submerged and washed out, all travel ceased; heavy and incessant rains for three days. Stoneboro, 10th, water highest for many years; heavy and incessant rains for four days; bridges gone and roads impassable. Rochester, 10th, lower portion of town submerged; Beaver river higher than ever before known. Bolesville, 10th, whole town flooded; all travel and business closed. Freedom, 10th, town partially flooded; people leaving for places of safety. St. Clair, 10th, portion of town flooded; great destruction of property; farmers along the river bottoms leaving for places of safety. Bridgewater, 10th, highest water ever known; immense fields of grain destroyed. Harmarville, 10th, river highest for past 16 years; Twelve Mile Island overflowed to a depth of 8 feet; great loss to garden and farm crops. Bradford, 17th, heaviest rain storm that ever visited Tuna Valley; creeks and rivers overflowed, causing great destruction of property. *West Virginia*: Wheeling, 8th, remarkably heavy rain storms; narrow mountain streams converted into raging rivers, carrying everything before them; the National Road bridges were swept away, farms inundated and

crops destroyed; houses were flooded without warning, and people driven into the streets. At Glenn's Run, 4 miles from the city, a house was carried away, drowning five persons. Fulton, 8th, damage to property very great; farms flooded for miles; crops a total loss. Leatherwood, 8th, most of town flooded; bottom lands under water; loss to crops almost incalculable; bridges everywhere carried away. Philadelphia, 8th, several buildings flooded; railroad and other bridges carried away; loss of property very great.

Water Spouts.—On Chesapeake Bay, off Hooper's Island, 9th, during the passage of a severe squall, a large spout suddenly descended, and, catching a small schooner near by, completely turned her over. Port Eads, La., 29th, two were observed at 1.20 p. m., over the Gulf to the southeast; they formed under a cumulo-stratus cloud in the shape of a cone; one disappeared before its completion; the other gradually elongated until it reached the water. The upper portion, or cone, was of the same color as the cloud, and the lower portion was of a light gray. It moved to the SSE., and at 1.28 p. m. broke, leaving a ragged edge, which rose to the cloud. Ft. Stevenson, Dakota, 11th, observed about two miles from post before the approach of a terrific hail-storm.

Cloud Burst.—Seven Star Springs, Barry Co., Mo., 11th, broke in the hills above the town, the water rushing down, carrying away houses, household goods and animals. Five persons drowned.

High Tides.—Coney Island, 10th, unusually high, overflowed the meadows behind the hotels.

TEMPERATURE OF WATER.

The temperature of water as observed in rivers and harbors at Signal Service Stations, with average depth at which observations were taken, is given in the table on the left-hand side of chart No. III. Owing to breakage of instruments, etc., observations are wanting as follows: Cleveland, 1st to 5th and 9th; Indianola, 1st to 22d; San Francisco, 1st to 20th.

ATMOSPHERIC ELECTRICITY.

Thunder Storms.—In the various districts they were reported on the following dates: New England, 4th to 7th, 13th to 15th, 19th to 21st, 23d, 26th, 28th and 29th. Middle Atlantic states, 1st to 10th, 13th, 14th, 16th to 21st and 26th to 30th. South Atlantic states, 1st to 4th, 6th, 8th to 11th, 14th, 17th to 22d, 24th to 30th. Eastern Gulf states, 1st, 2d, 4th, 6th to 12th and 14th to 30th. Western Gulf states, 1st, 2d, 4th, 6th to 10th, 13th, 14th, 16th, 17th, 19th to 27th, 29th 30th. Ohio valley and Tennessee, 1st to 9th, 13th to 21st, 23d, 25th to 30th. Lower Lake region, 1st, 2d, 6th to 8th, 12th, 13th, 15th to 17th, 20th, 25th, 27th, 28th. Upper Lake region, 1st to 3d, 5th to 8th, 11th to 13th, 16th, 18th to 20th. Extreme Northwest, 5th to 13th, 15th, 16th, 19th, 26th, 27th. Upper Mississippi valley, 1st, 2d, 4th to 8th, 10th to 21st, 23d, 24th, 26th to 30th. Missouri valley, 1st to 12th, 14th, 15th, 17th, 19th to 30th. Northern Slope, 1st to 15th, 18th to 25th, 28th. Middle Slope, 1st to 12th, 14th, 17th, 19th, 21st to 30th. Southern Slope, 1st, 2d, 5th to 12th, 25th to 27th, 29th. Rio Grande valley, 6th, 8th, 20th, 26th, 29th. Southern Plateau, 3d, 5th, 14th to 16th, 18th, 24th. Middle Plateau, 4th, 10th, 13th. Northern Plateau, 1st to 3d, 7th to 10th, 13th, 14th, 18th to 20th, 23d, 28th. North Pacific coast region, 8th. California, 2d, 3d, 5th, 6th, 14th.

The following items of interest connected with the peculiar manifestations of electricity during the progress of thunder storms were obtained from various sources: Williamsbridge, Westchester Co., N. Y., 14th, at telegraph office, where 116 wires centre, the electric current was so powerful that it drove everyone out of the rooms. The switch boards were covered with one sheet of fire; large balls of electricity leaped from the instruments and shot out from the pins and plugs at the end of the wires. The manager of the office was knocked down as he approached the switch board. In the vicinity of the town two boys were instantly killed as they took shelter from the storm under a large tree. Not a mark or bruise except a black spot on the left leg of one of them was found upon their bodies. The lightning followed down the trunk in a serpentine manner, boring a ragged hole in the ground near the roots. Wakefield, N. Y., 14th, house demolished, prostrating the inmates and killing a horse standing in the street. One of the inmates was thrown violently to the floor, and had a hole about the size of a saucer burned in her dress. Rockport, Ind., 24th, two laborers having driven a reaping machine under a tree, were struck, one of them instantly killed, while the other had his pantaloons legs ripped open and his shoes torn off, but no further injury. Arcola, N. J., 14th, ice-houses fired and destroyed; one laborer was struck and thrown 40 feet. Elizabeth, N. J., 14th, while two persons were fishing in a sail boat upon Newark Bay one of them was killed instantly, leaving the other uninjured. His clothing was stripped from him and his left boot ripped open as if it had been cut with a knife. The lightning after leaving the body tore a large hole in the bottom of the boat. Anne Arundel Co., Md., 10th, a barn containing 15 or 20 people was struck, killing four persons and severely injuring several others. Two of the victims were fearfully burned, while the others showed only a purple scar where struck. Reistertown, Md., 10th, a young man killed while working in the field, his companion standing very close to him was only knocked down, but with no resulting injury. Henrietta, Tex., 9th, two ladies instantly killed while riding along in a carriage. Peoria, Ill., 11th, a farmer while crossing the iron bridge over Kickapoo river was instantly killed; his son close beside him was not injured. Hunnewell, Kan., 12th, a farmer instantly killed